MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2016/2017

EME3066 – CAD/CAM

(ME)

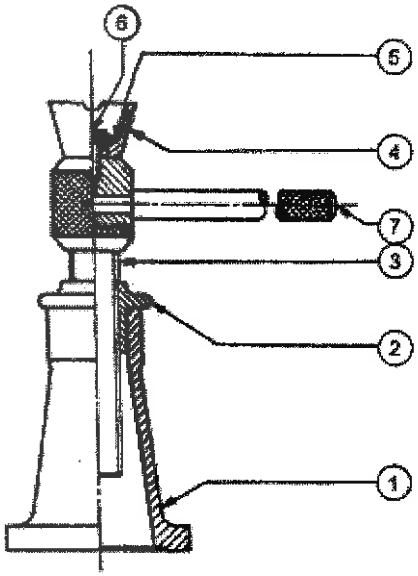
7 OCTOBER 2016
9:00 a.m. – 11:00 a.m.
(2 Hours)

INSTRUCTION TO STUDENT

1. This Question paper consists of 5 pages including cover page with 4 Questions only.
2. Answer **ALL FOUR** questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please write all your answers in the Answer Booklet provided.

Question 1

(a) Explain the methods required to design the solid model of any five parts of the screw jack given in Fig. Q1. **[10 Marks]**



No.	Parts	Quantity
1	Body	1
2	Nut	1
3	Spindle	1
4	Cup	1
5	Washer	1
6	Screw	1
7	Handle	1

Fig. Q1 Screw Jack

(b) Discuss any two important modelling issues of an assembly modelling **[5 Marks]**

(c) Draw an assembly tree for the screw jack shown in Fig. Q1 and specify the assembly constraint requirements for the parts. **[10 marks]**

Continued ...

Question 2

(a) State the three (3) main phases of 'Prototyping' development. **[3 marks]**

(b) Based on your answer in part (a), differentiate them in terms of their working principle. **[9 marks]**

(c) State the difference between the schematic diagram of a 3D Printer and Fused Deposition Modelling.

(Note: You may use appropriate and neat sketches to support your answer)

[13 marks]

Question 3

(a) By means of a sketch, explain how Parting and Grooving of turning operations are carried out. **[4 marks]**

(b) Generally, more than one cutting tool is involved during a typical turning operation. In your own words, state the 4 different tool materials used to produce a cutting tool. For each of the tool materials identified, state ONE advantage and application.

[12 marks]

(c) One element under the Numerical Control Systems is the 'motion system'. By means of a sketch, state the different characteristics available under the 'motion system'. **[9 marks]**

Continued ...

Question 4

(a) What are the 4 motion groups in the preparatory functions in CNC programming? **[4 marks]**

(b) For the component shown Fig. Q4, make a part program for machining on a CNC machining center equipped with the ISO controller using absolute programming. Choose the bottom left datum, A as the origin of the part and cut in "clockwise direction". (All dimensions in mm) **[21 marks]**

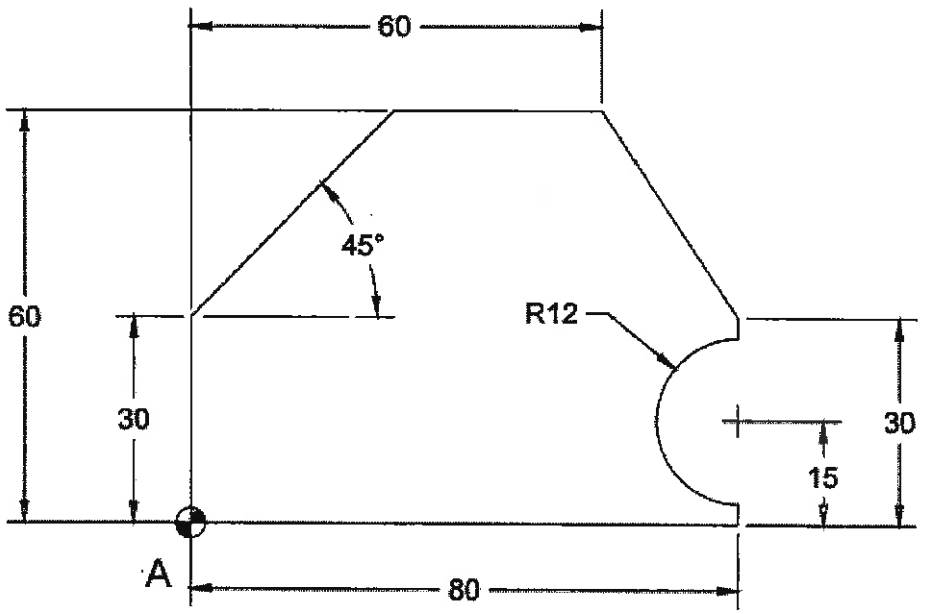


Fig. Q4

Continued ...

Appendix : Description of G codes and M codes (*Milling*)

G00 Rapid Traverse or Fast Traverse	M00 Program Stop
G01 Linear Interpolation or Slow Traverse	M02 Program End
G02 Circular Interpolation, CW	M03 Spindle on Clockwise
G03 Circular Interpolation, CCW	M04 Spindle On Counterclockwise
G04 Dwell	M05 Spindle Stop
G17 XY Plane Selection	M06 Tool Change
G18 ZX Plane Selection	M08 Coolant On
G19 YZ Plane Selection	M09 Coolant Off
G20 Imperial Units (Inches)	M10 Work Clamp On
G21 Metric Units	M11 Work Clamp Off
G28 Goto Reference Point	M13 Coolant Spindle Fwd
G40 Cancel Tool Radius Compensation	M14 Coolant Spindle Rev
G41 Left Hand Radius Compensation	M30 Program Stop, Reset To Start
G42 Right Hand Radius Compensation	M98 Subprogram Call
G73 Past Peck Drilling Cycle	M99 Subprogram Exit
G74 Counter Tapping Cycle	
G84 Tapping Cycle	
G85 Boring Cycle	
G90 Absolute Positioning	
G91 Incremental Positioning	
G92 Set Datum	
G94 Per Minute Feed	
G95 Per Revolution Feed	
G98 Initial Level Return	
G99 R Point Return	

End of Paper.